SPECIFICATION

TITLE

METHOD FOR CONTROLLING THE TRANSMISSION OF DATA

FIELD OF THE TECHNOLOGY

[0001] The present disclosure relates to a method for controlling the transmission of data.

BACKGROUND

[0002] From the steadily converging communications and information technologies, networks are known, such as for example the "local area network" LAN, with a multitude of stations designed for data transmission, in which the transmission of data is effected by conduction, i.e. over wires which connect the stations, while for a local network constructed in accordance with the IEEE 820.11 standard (wireless local area network, WLAN) the transmission is realized by wireless means, i.e. over a radio link, with a hybrid network of stations which are linked in via wires or radio links also being permissible in the case of a WLAN.

[0003] Stations that are connected to decentralized and non-deterministic networks of this type mostly have applications implemented on them, or in some cases permanently installed in them, which cover various services and which - depending on the nature of the station - can differ from one station to another. Thus, the convergence of networks in the information and communication technologies has led to the development of networks and services from the transmission of "non-time-critical" data, such as arises with a file transfer or the transmission of e-mails, through to networks with "time-critical" data, such as for example the transmission of streaming media, speech data ("Voice over IP, VoIP) and video conferences. One reason for these latter services are time-critical is that delays and/or loss of data is immediately detected, i.e. heard or seen, by a user, and for this reason, the associated data should be transmitted as nearly as possible in real-time.

[0004] Accordingly, a so-called quality of service has been introduced in the IEEE802.11 standard. The term quality of service (QoS) is to be understood as covering all methods which influence the data flows in LANs and WANs in such a way that the service is prioritized or arrives at the receiver with a specified quality.

A prioritization approach provides for a higher priority being assigned to time-critical services, such as video-conferencing, than to non-time-critical ones, whereby data packets with a higher priority are preferentially transmitted.

[0005] A disadvantage in networks of this type is that each of the stations, at which data is ready to be transmitted, has the same right to occupy the transmission medium if the data to be sent has the same priority. As the number of transmitting stations increases, the capacity of the medium available for each station decreases steadily until it is no longer possible to adhere to quality of service parameters such as the data transmission rate and delay. The ultimate result of this, especially in connection with the provision of time-critical services such as voice or video stream transmission, is that none of these services can be handled to the satisfaction of the service user.

BRIEF SUMMARY

[0006] Data links are assigned to different applications over a transmission medium in a network, particularly a local one, having at least two stations designed for data . Applications are assigned different priorities together with different parameters to identify a quality of service, where the establishment of a new data link by a first station, assigned to a first application, is restricted as a function of the available free channel capacity on the transmission medium together with the occupancy of the transmission medium by existing data links, for which the applications have a priority corresponding to that of the first application.

[0007] The method ensures that existing links, in particular those for applications with high quality of service requirements, such as for example video or voice data transmission, are not detrimentally affected by newly-arising connection wishes from applications with the same priority class. In this way it is possible to ensure that the quality of the services which have already been offered remains largely constant.

[0008] When there is a requirement for the establishment of a new data link, this data link is set up by the first station without regard for the current utilization, while the transmission medium is occupied by data links assigned to an application with at least a second priority corresponding to that of the first application, at least

one of the second stations which are maintaining these links signals in such a way that on the transmission medium a message is communicated with the highest priority to the first station and, after it has received the message, the first station suspends the new data link, at least temporarily, then the determination of the current resource usage is simplified, because this is already indicated by those stations which are already active. This further permits externally initiated occupancy control.

[0009] Also, when there is a request for the establishment of a new data link, the first station determines whether a measure of the available free channel capacity corresponds to a measure of the necessary channel capacity given by the parameters of the first application. Any data traffic that is assigned to applications with lower priority than the priority of the first application is regarded, in the context of the determination procedure, as free channel capacity. If the result of the determination is positive, the data link is set up. If the result of the determination is negative, the establishment of the data link is suspended, at least temporarily.

[0010] In doing this, the assessment of the free channel capacity should preferably be based on a threshold decision, where the channel capacity is regarded as free up to the point where a threshold is reached. Here, the threshold corresponds in general to a previously defined percentage level of data traffic which is assigned to applications with lower priority. In this connection, a threshold of this type offers the advantage that, if structured as a parameter, it can easily be modified appropriately for the conditions in the system.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The various objects, advantages and novel features of the present disclosure will be more readily apprehended from the following Detailed Description when read in conjunction with the enclosed drawings, in which

[0012] Figure 1 illustrates an arrangement of a wireless local network according to an exemplary embodiment.

DETAILED DESCRIPTION

[0013] Figure 1 shows as a model six stations MT1..MT6 in a wireless network which makes use of the method in accordance with the present disclosure.

[0014] In the embodiment of Figure 1, it is assumed that, between a first station MT1 and a second station MT2, and between a third station MT3 and a fourth station MT4, data is transmitted wirelessly (continuous lines), i.e. over a defined air interface. Also, the data stream is assumed as not fully using up the channel capacity of the air interface, so that the quality of service, required for the services provided by the data transmission, for example video and voice data transmission, can be adhered to without loss.

[0015] Starting from this initial situation, three possible more advanced scenarios will be discussed for purposes of illustration.

[0016] Scenario 1: A fifth station MT5 wants to transmit data to a sixth station MT6, until now inactive.

[0017] Scenario 2: The fifth station MT5 wants to transmit data to a station which is already receiving high-priority data, e.g. video-conferencing, such as for example the second station MT2.

[0018] Scenario 3: The fifth station MT5 wants to transmit data to a station which is already transmitting data.

[0019] For the following discussion, it is further assumed that the channel capacity of the air interface would not be sufficient for the data arising from the fifth station without a loss of quality on the links which already exist, and that the stations MT2, MT4 and MT6 do not lie within the radio reach of the station MT5.

[0020] In such a situation it is possible that, for an existing capability by the fifth station MT5 to transmit data, an internal data buffer of the first station MT1 and an internal data buffer of the fourth station MT4 will no longer be emptied, and an overflow would be threatened.

[0021] In the case of scenario 1, when a data overflow was detected, the fifth station MT5 would in accordance with the embodiment be requested by the fourth station MT4 to halt its data service for a period x. If, upon expiration of this period x, the fifth station MT5 were to cause a data overflow during its renewed attempt to transmit the data, then in accordance with the embodiment a request would again be made from the fourth station MT4 for the service to be postponed for a further period x, this time increased by a discrete value.

[0022] If a buffer overflow arises at the first station MT1, it will report this to the second station MT2 which, for its part, passes on the request for suspension of the data transmission for a period x to the fifth station MT5.

[0023] In the case of scenario 2 and scenario 3 it is possible, for example, to effect the rejection of the fifth station MT5 implicitly, when a capacity bottleneck is detected, by a refusal of the transmit permission, e.g. by refusing the CTS (clear to send), where in the case of scenario 2 this requires in turn a message from the first station MT1 to the second station MT2 about an internal buffer overflow.

[0024] It should be understood that various changes and modifications to the presently preferred embodiments described herein will be apparent to those skilled in the art. Such changes and modifications can be made without departing from the spirit and scope of the present disclosure and without diminishing its intended advantages. It is therefore intended that such changes and modifications be covered by the appended claims.